

Left-Handedness and Accident-Related Injury Risk

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Abstract: Self-reported injuries among left-handed and right-handed people were compared in a survey of 1,896 college students in British Columbia, Canada. Left-handers were more likely to report having an injury requiring medical attention during the last two years (OR = 1.89, 95% CI = 1.39, 2.58). Relative risk was highest for left-handed males when driving motor vehicles (OR = 2.35, CI = 1.25, 4.43). Regardless of handedness, males had slightly higher relative risks of injury than females. (*Am J Public Health* 1989; 79: 1040-1041.)

Introduction

Several reports show that the percentage of left-handers in the population decreases with increasing age,¹⁻⁴ with about 13 percent left-handedness in samples of 20 year olds, diminishing to 5 percent for those in their 50s, and to virtually 0 percent for samples age 80 and older.¹ Evidence suggests that this change in the frequency of left-handers is not explainable by historical trends in social pressure for right hand use.¹⁻³ In the belief that the absence of left-handers from the oldest age groups reflected higher risk of mortality for sinistrals, Halpern and Coren⁵ conducted a study that suggested an association between left-handedness and shorter life-span. Using archival records from 2,271 deceased professional baseball players (excluding those with evidence for switched or inconsistent handedness), they found that the annual survival rate of right-handers exceeded that of left-handers by an average of about 2 percent. They suggested three possible causes:

- Left-handedness is sometimes associated with prenatal and perinatal stressors (e.g., low birthweight, prolonged labor, birth-related anoxias, Rh incompatibilities, and older mothers^{1,6,7}) which may have sequelae that result in reduced survival ability.
- There are demonstrable associations between left-handedness, high levels of prenatal hormones, allergies, and immune disorders that may increase the risk of early mortality.^{8,9}
- An environmental factor, the technological and behavioral bias toward dextrality, may be involved. Porac and Coren¹ collected numerous anecdotal reports that, because tools, machinery and even traffic patterns have been designed for the convenience of right-handers, left-handers may be more subject to accidental injuries which, individually or cumulatively, may result in reduced longevity.

The study reported below investigates the effects of handedness on injury risk.

Methods

A retrospective self-report procedure was employed. A sample of 1,896 students from the University of British

Columbia (1,251 Caucasian, 567 Oriental, and 78 Black, American Indian or other, mean age 21.0, S.D. 5.62) were assessed in intact classroom units. All were tested for handedness using a four-item self-report inventory that assessed the hand used to perform common activities, specifically: drawing, throwing a ball, dealing cards and using an eraser on paper. This set of items has been shown to have a 97 percent concordance with behavioral testing and to be reliable over test-retest periods of a year.^{1,10,11} In addition, individuals were asked to report if, in the previous two years, they had had any accidents in five categories of activity: when using tools or implements, while driving in traffic, when at home, when at work, or while participating in sports. Only accidents resulting in injuries that required medical attention were considered. No data were collected on medical events other than injuries, and medical confirmation of reported injuries was not sought.

Results

Analysis of the handedness patterns revealed 1,718 (90.5 percent) right-handers and 180 (9.5 percent) left-handers in this sample, which is similar to the usually obtained handedness distribution for this age group.¹

Table 1 presents the distribution of injuries as a function of handedness as percentages and frequencies, while Table 2 presents estimates of relative risk in the form of odds ratios and their 95 percent confidence intervals. The relative risk of all injuries were elevated for left-handers. Although males tended to report more accident-related injuries than females overall (OR = 1.81, CI = 1.50, 2.18), left-handers had higher relative risks for both genders.

Among individuals reporting injuries in more than one category of activity, male and female left-handers were at higher risk.

Consideration of specific injury categories must be done with some caution, since we are partitioning the data into somewhat sparse groupings, and the relative distributions will be highly asymmetrical given the fact that the vast majority of the sample are right-handed and the bulk of the sample have not suffered from an injury in any given category. Table 2 shows higher relative risk of injury for left-handers in each of the five categories, although the only individual activity classification for which the elevation of risk is statistically significant is for injuries while driving a vehicle. The binomial test for all five comparisons in the same direction has $p = 0.04$. The same pattern appears with data segregated according to gender.

Discussion

These data suggest that overall (ignoring specific categories of activity) left-handers have increased risk of accident-related injuries, and higher risk of being injured in multiple categories of activity. Alternatively, the patterns seen could reflect a greater likelihood of left-handers to remember or report accidents, but we know of no data to suggest such a bias.

The most likely reason for the increased risk of injuries in left-handers comes from implicit and explicit biases of the environment toward maximal convenience of the right-

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TABLE 1—Percentage of Individuals Suffering an Accident-Related Injury Requiring Medical Attention, as a Function of Handedness (frequencies in parentheses)

Accidental Injury Category	All Cases (N = 1896)		Females (N = 1086)		Males (N = 810)	
	Left-handed (180)	Right-handed (1716)	Left-handed (96)	Right-handed (990)	Left-handed (84)	Right-handed (726)
At least one injury any category	51.7% (93)	36.1 (619)	42.73 (41)	30.6 (303)	63.0 (53)	43.6 (316)
More than one injury category	20.0 (36)	12.3 (211)	15.5 (15)	9.6 (95)	25.0 (21)	16.0 (116)
Work-Related	15.4 (28)	12.8 (220)	11.6 (11)	10.5 (104)	20.0 (17)	15.9 (115)
In the Home	12.6 (23)	9.0 (154)	10.6 (10)	9.0 (89)	15.5 (13)	9.0 (65)
Sport-Related	31.6 (57)	27.9 (479)	25.5 (25)	21.6 (214)	39.2 (33)	36.4 (264)
Driving a Vehicle	10.3 (19)	6.0 (103)	5.3 (5)	4.7 (46)	16.6 (14)	7.8 (57)
Using tools or implements	7.5 (14)	5.2 (89)	6.4 (6)	3.8 (38)	8.3 (7)	7.0 (51)

TABLE 2—Odds Ratios* for Accident-Related Injuries in Left-Handers with 95% Confidence Intervals

	All Cases		Female		Male	
	OR	CI	OR	CI	OR	CI
At least one injury any category	1.89	1.39–2.58	1.69	1.10–2.59	2.22	1.39–3.54
More than one injury category	1.78	1.20–2.64	1.75	0.97–3.15	1.75	1.03–2.99
Work-Related	1.25	0.81–1.92	1.10	0.57–2.13	1.35	0.76–2.38
In the Home	1.49	0.93–2.37	1.18	0.59–2.35	1.86	0.98–3.55
Sport-Related	1.20	0.86–1.67	1.28	0.79–2.06	1.13	0.71–1.80
Driving a Vehicle	1.85	1.10–3.10	1.13	0.44–2.91	2.35	1.25–4.43
Using tools or implements	1.54	0.86–2.77	1.67	0.69–4.06	1.20	0.53–2.74

*Defined as (injured LH/uninjured LH)/(injured RH/uninjured RH)

handed majority. Everyday implements, such as scissors, gearshifts, and can openers, even the direction in which the threading of screws is angled, are biased toward right-handed use. Traffic patterns are designed to utilize the clock-wise turning bias of the right-hander. Many power tools, in their usual configurations, provide for free use of the right hand to manipulate materials, while restricting movements and utility of the left-hand, as can be seen in lathes, band saws, and some milling machines. Thus, to function in the right-handed world, the left-hander must either work with his non-dominant and less proficient right hand, or must adopt body postures and manipulation patterns which are at variance with the design of the machines. Such activities place the sinistral at a higher risk of suffering an accidental injury. This increased risk may be a significant factor in determining the longevity of sinistrals as a group (since injuries have been shown to be the underlying cause of death for more than 95 percent of individuals aged less than 55 years¹¹) and may account for the relative rarity of left-handers in older age groups.

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